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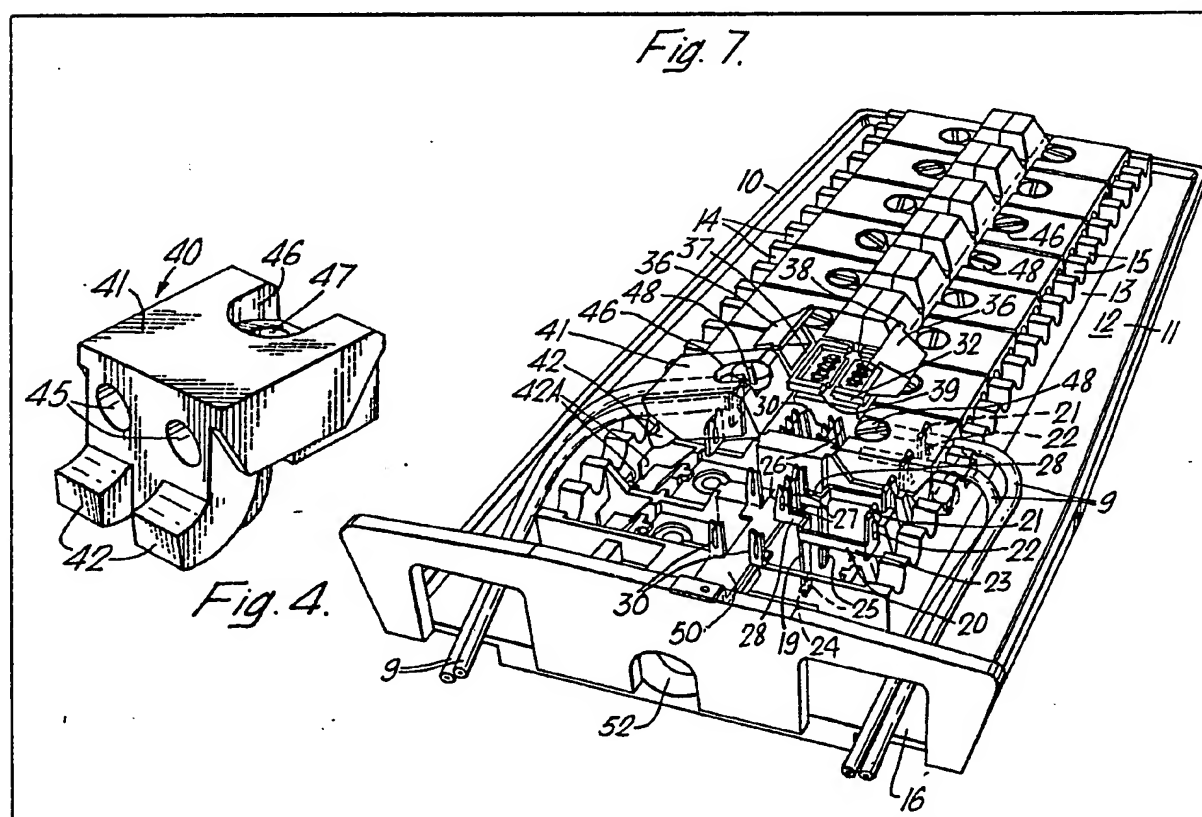
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the bolt is unscrewed, element 40
pivots back to disengage the wire(s)
from the connector.

(54) Terminal block

(57) A terminal block for connecting
exchange side telephone cables to
drop wires comprises an insulating
body 11, at least one bifurcated
solderless connector 20, at least
one pivotally mounted element 40
having one or more passages 45
for receiving wire(s) 9, and a bolt
48 which passes through a hole 47
in the element to engage a nut on
body 11. Screwing the bolt into the
nut pivots element 40 to urge
wire(s) 9 into connector 20; when



The drawing(s) originally filed was/were informal and the print here reproduced is taken from a later filed formal copy.

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Fig. 1.

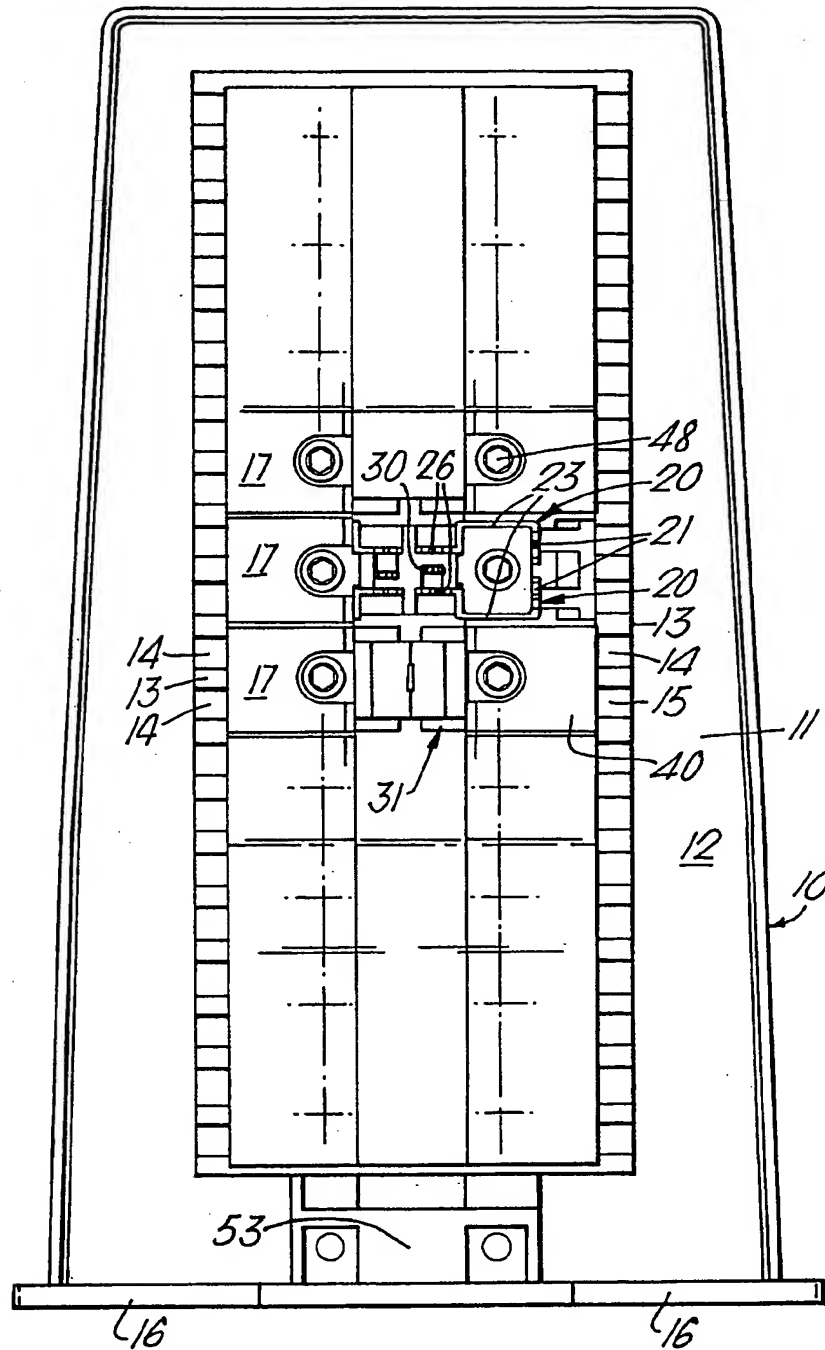
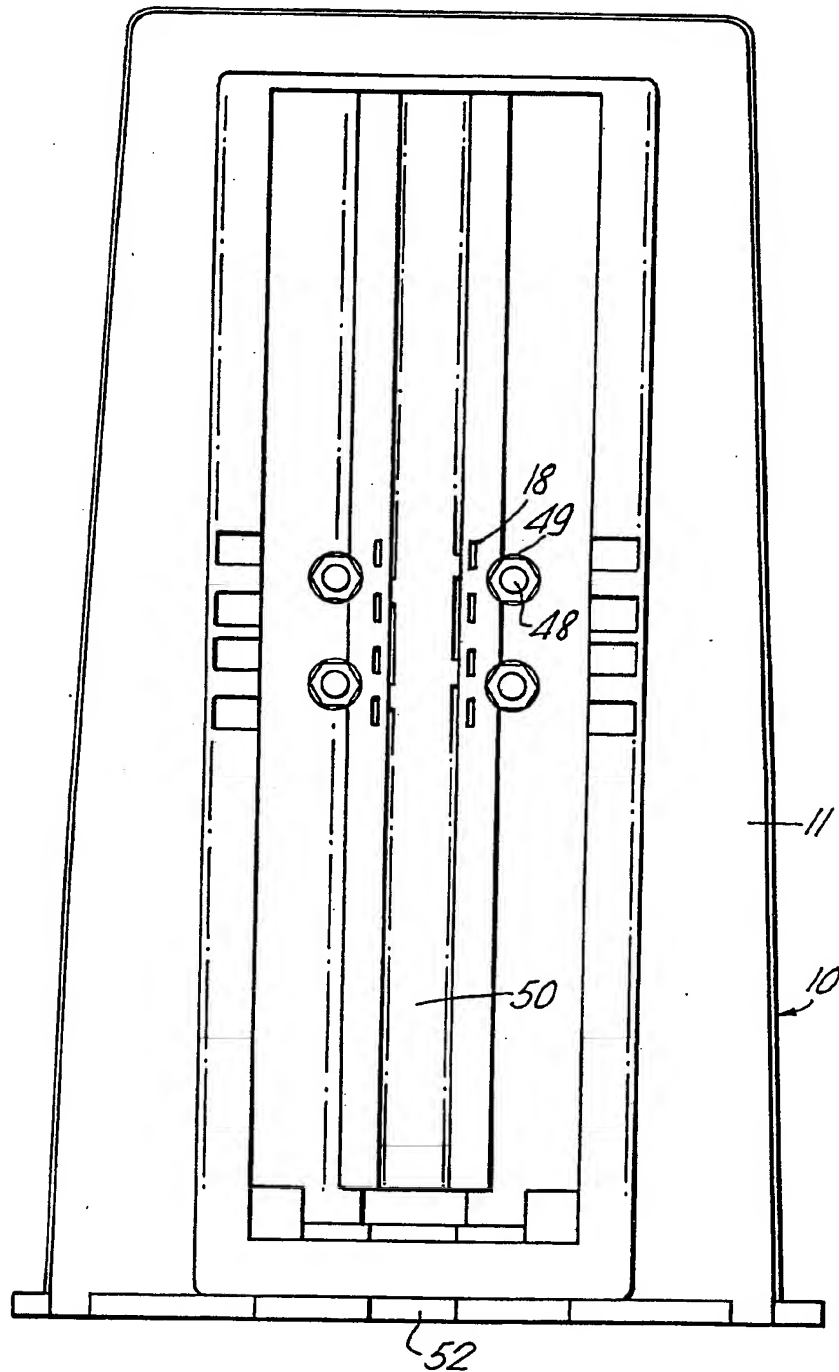


Fig. 2.

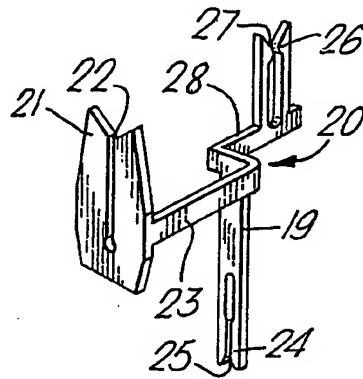


Fig. 3.

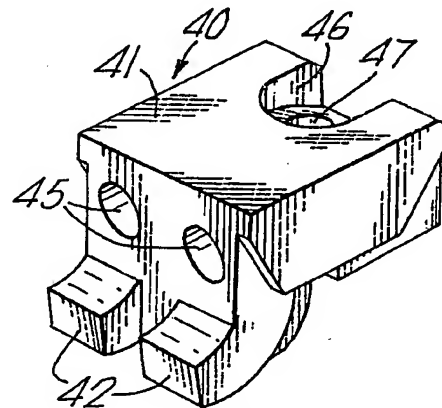


Fig. 4.

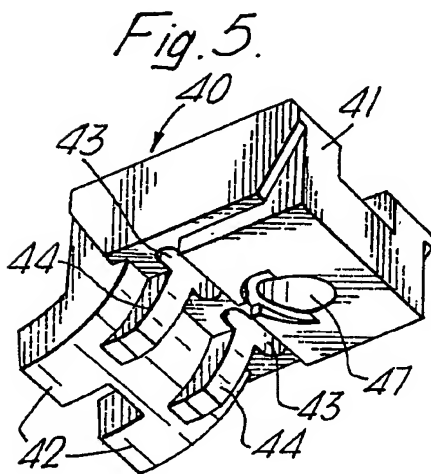


Fig. 5.

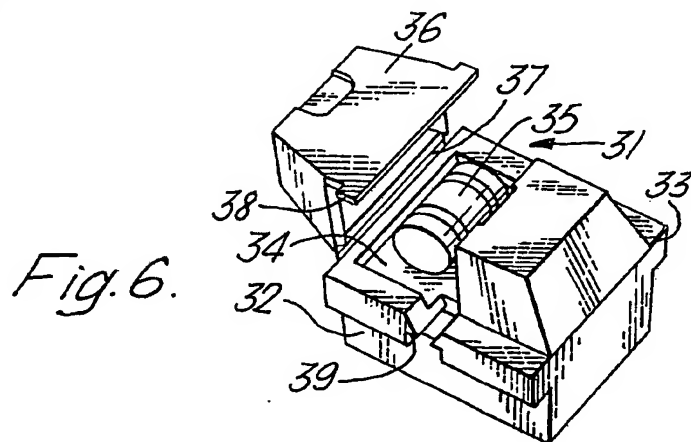


Fig. 6.

Fig. 7.

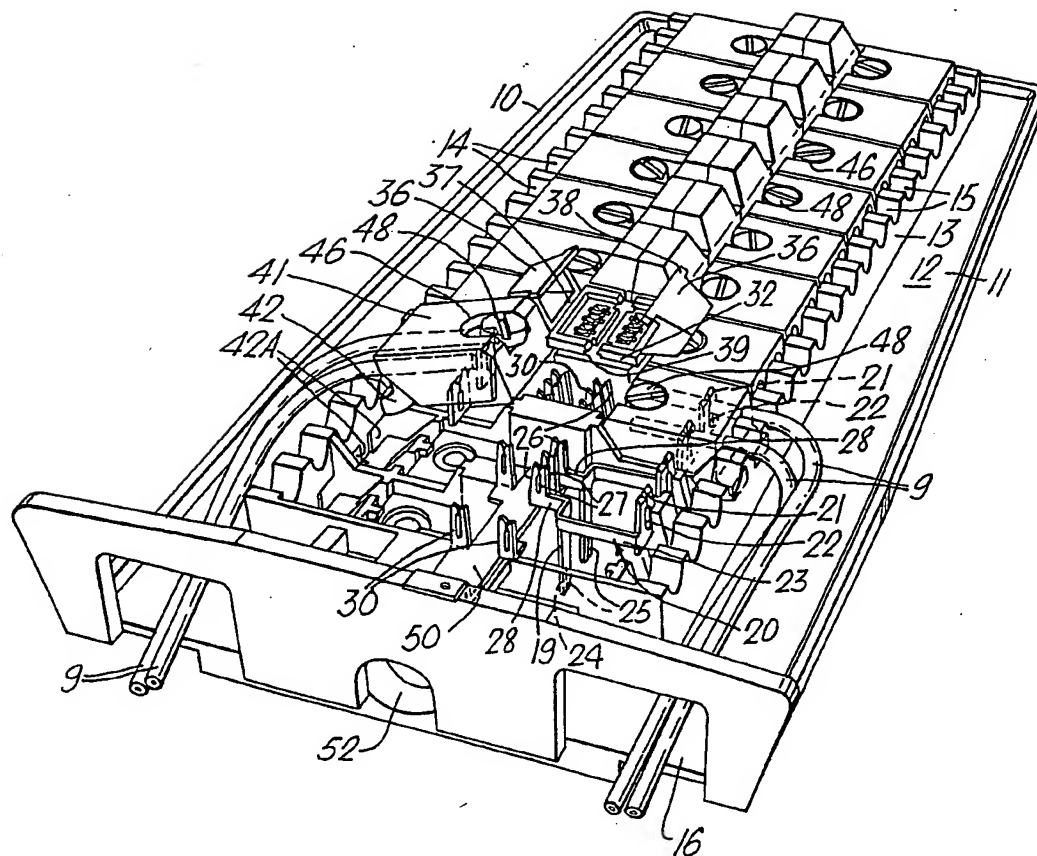
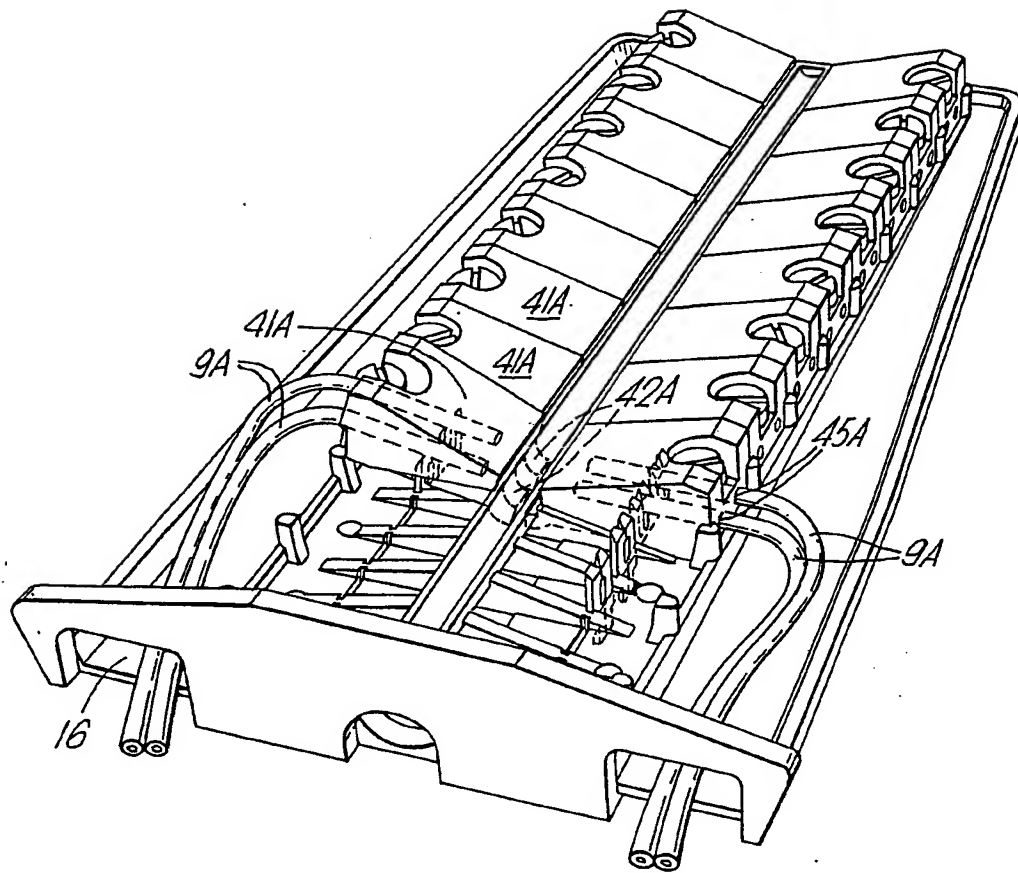


Fig. 8.

SPECIFICATION

Terminal block

5 The present invention relates to terminal blocks. Terminal blocks are used in a vast number of environments and one particular important environment is in telephony. It is quite common for the so-called exchange side cable, which has a large number of wire pairs, to lead to a telegraph pole and a terminal block connector is provided from which the individual drop wires go to the various subscribers.

10 The terminal block is usually located some distance up a telegraph pole. A wireman installing or repairing an installation has to work up a ladder, often in cold conditions, so that any improvement to a terminal box which enables the wireman to connect the drop wires to terminals without having to use two hands all the time will obviously be very welcome.

An object of this invention is to provide a terminal block in which an element carrying a drop wire can be pivoted in a direction to engage the drop wire with a terminal, or in the disengaging direction, by a captive screw. This enables the wireman to engage and disengage the wire connection using one hand and it also ensures that there are no loose parts such as bolts or screws which might fall and be lost during an installation or repair. Thus the body of the terminal block according to this invention has pivotally mounted elements thereon, each having at least one passage for a wire, each element having a hole therein extending transverse to the passage or passages, a captive bolt passing through the hole and being engageable with the female thread, for example, a nut, mounted on the body, whereby when said bolt is screwed into the female thread, the elements pivot in a direction such that the wires are urged into a bifurcated solderless connector, so that the conductors therein make electrical contact with the connector, and when the bolts are unscrewed the pivotal elements are made to pivot back to disengage the wires from the connectors.

It is because the bolt is captive in the pivotally mounted elements that this disconnection of the wires from the solderless connector can be greatly facilitated. Relatively thick wires can be introduced into the solderless connectors because of the high degree of force which can be imparted easily by the screw action of the bolt and associated nut.

Preferably the pivotal element is made of insulating material and has one or more hinge lugs extending from one side edge for pivotal engagement with the body either adjacent the longitudinal centre line of the terminal block or adjacent one or both longitudinal edges.

65 Preferably the pivotal element has a recess

to receive two wires adapted to be urged into respective connectors.

The conventional assemblies involving the terminal blocks are cumbersome and difficult to connect up in a simple manner so that they are consequently rather expensive both to manufacture and to install.

It is now proposed, according to an optional feature of the present invention, to provide in the terminal block a plurality of spaced pairs of one-piece metal terminals, each metal terminal including first, second and third connection points, the first connection point being positioned to connect and retain the conductors of a first wire pair, the second connection point being positioned to connect and retain the conductors of a second wire pair and a third connection point being positioned adjacent one another and adjacent an earthing connection point, whereby a lightning protector may be connected to both of the third connection points and to the earthing connection point.

It has been found that by providing the one-piece terminal with first, second and third connection points, a very simplified structure can be achieved in which there is no need to have the conventional fine wires which pass from the normal terminal block to a separate unit including the lightning protectors.

Advantageously, the first and second connection points are located on opposite faces of the insulating body and the first and third connection points are located on the same face of the insulating body. By having the first and third connection points so located, the connection of the lightning protector can be facilitated.

Preferably the first and second terminal points are in the form of bifurcated solderless connections which simplifies very considerably the introduction of the wires of a pair into them, since the wires do not have to be bared, but simply pushed into the solderless connectors.

The earthing connection point may be mounted in an insulating housing which can be inserted in or be integral with the insulating body to cover the two third connection points of a pair, the insulating housing having on its surface, overlying the third connection points, apertures through which the plug terminals of the associated lightning protectors may pass, to make electrical connections with the two third terminal points and the earth connection point. The provision of this removable insulating housing can greatly facilitate the manufacture of the terminal block according to the invention.

Advantageously, the hinge covers are mounted on the insulating housing, to be movable from an open position in which the lightning protectors can be removed or inserted, and a closed position in which the lightning protector is sealed from the environ-

ment. A simple method of manufacture is for the hinged covers to be hinged by an integral plastic hinge which not only is inexpensive to manufacture, but also provides a very satisfactory sealing.

In order that the invention may more readily be understood, the following description is given, merely by way of example, reference being made to the accompanying drawings, in which:—

Figure 1 is a top plan view of one embodiment of terminal block according to the present invention;

Figure 2 is an underneath plan view of the terminal block of Fig. 1;

Figure 3 is a perspective view of one of the one-piece metal terminals, to an enlarged scale;

Figures 4 and 5 are perspective views of the pivotally mounted elements of the terminal block of Figs. 1 and 2;

Figure 6 is a perspective view of one of the insulating housings of the terminal block of Fig. 1;

Figure 7 is an isometric view of a terminal block embodying the present invention; and *Figure 8* is an isometric view of another terminal block embodying the present invention.

Referring first to Figs. 1 and 2 and 7, the terminal block indicated by the reference numeral 10 comprises an insulating body 11 formed of plastics material and includes a support base (not shown) locatable below the lower surface illustrated in Fig. 2 and a slidable cover (not shown) which covers completely over the whole assembly to protect it from the weather. The base will be secured, for example, to a telegraph pole. On the upper surface 12 of the body 11 there is provided an upstanding wall 13 on each side, this wall being provided with castellations forming a large number of indentations 14, 15 for the passage of two wires of a wire pair of a drop wire. The various drop wires which have their wire pairs 9 passing through the indentations 14, 15 enter the housing through openings 16. The wires then extend along beside the castellations 13 and are then bent inwardly to the respective terminal areas of which there are in fact ten, only three of which are shown in full in Fig. 1, the other seven being indicated by phantom lines indicating their centre. Thus, ten drop wires can enter on each side so that the terminal block is capable of connecting an exchange side cable to twenty drop wires. Each connection zone 17 has associated therewith a pair of through openings 18 of rectangular cross-section which can be seen in Fig. 2. Each of these openings is designed to take a downwardly extending leg 19 of a one-piece metal terminal 20 illustrated in Figs. 3 and 7. This metal terminal 20 includes three connection points. These are a first connection point 21

in the form of an upwardly facing bifurcated solderless connection having a central slot 22, this being mounted at the end of an arm 23 which is cranked as compared with the leg 19. A second bifurcated solderless joint 24 having a slot 25 is mounted at the lower end of the leg 19 while the third connection point 26 is in the form of a bifurcated element having a central opening 27 and formed on an arm 28.

The first and third terminal points 21 and 26 extend upwardly above the upper surface of the connecting zone 17 whilst the second connecting point 24 extends down through the opening 18 and below the lower surface.

As can be seen from Fig. 1, each connection zone 17 has a pair of one-piece metal terminals 20 disposed in mirror image relationship so that the third terminals 26 are close to one another and also arranged on either side and adjacent to an earthing terminal 30.

The earthing terminal 30 is formed on an insulating housing 31 which is shared between two terminal zones 17 which are arranged side-by-side as seen in Fig. 1. This insulating housing 31 (Fig. 6) includes a base 32 which is insertable in an appropriately shaped opening in the body 11 and is provided with a flange 33 to prevent it being pushed completely through. The base 32 has formed therein six apertures extending through the upper surface 34 of the base.

These apertures are arranged in two sets of three to take the three terminal prongs of two lightning protectors 35 only one of which can be seen in Fig. 6. The two outer terminal prongs engage the two bifurcated connectors 26 while the inner terminal prong engages the earthing connection 30 for each protector. The protectors are, in use, enclosed by a cover 36 which is hinged by a solid plastic hinge 37 to the base 32. In order to remove or insert a lightning protector, the cover 36 can be hinged back as shown on the left in Fig. 6, but in use, it is moved to the closed position in which it is held by a projection 38 engaging under a detent 39 formed in the flange 33.

Figs. 4 and 5 illustrate a pivotally mounted element 40 which is used to insert the wires into the connectors 21. Each element 40 includes a main block 41 and two laterally extending hinge lugs 42. These hinge lugs are engageable in depressions 42A formed in the lower part of the castellated wall 13 so that the blocks 41 can pivot.

As can be seen in Fig. 5, recesses 43 extend upwardly into the lower surface of the body 41 and one side of them forms a continuation of a pair of arcuately curved ramps 44 which have their centre of curvature at the centre of pivoting of the blocks 41 when they are installed. The recesses 43 are shaped to accommodate the connectors 21 of

a pair of connectors.

Extending laterally through the block 41 are a pair of passages 45 which go from the side of the block having the lugs 42 as far as the recesses 43.

The upper surfaces of the blocks 41 are counter-sunk at 46 and are provided with a hole 47 which extends downwardly, that is perpendicular to the passages 45. A bolt 48, (Fig. 1) passes downwardly through the hole 47 and is retained in place, so that it is captive in the block 41, by a circlip (not shown).

Referring now to Fig. 2, it can be seen that on the undersurface the body 11 is provided with nuts 49 into which the bolts 48 can be screwed. As the bolts 48 are tightened up, the blocks 41 are caused to pivot downwardly and because the bolts are captive, when the bolts are unscrewed, the blocks will pivot upwardly.

The lower surface of the body 11 is provided with a conducting strip 50 which is connected to each of the earthing connection points 30.

When the terminal block is used for connecting an exchange side cable to the drop wires at a telegraph pole, the exchange side cable is introduced through an opening 52 in the underside and the cable is clamped in a conventional way by a clamp 53 (Fig. 1). The various wire pairs are introduced into the appropriate ones of the second terminal bifurcated solderless connectors 24 which extend through the slots 18.

The drop wires 9 are introduced at 16 and the wire pairs are fed into the appropriate ones of the passages 45 in the blocks 41. The bolts 48 are then screwed down so that the wires, which had not been bared, are pushed forcibly down through the slots 22 in the first bifurcated solderless connectors 21. The drop wires are generally fairly heavy duty and the screw action of the bolt provided adequate force to push the insulators into these slots. It may, occasionally, be necessary to disconnect a drop wire and this is achieved by unscrewing the bolts 48, and since these are captive, the blocks themselves pivot up thus drawing the wire out of the slots 22.

The lightning protectors 35 are introduced in the manner described above and the covers 36 are closed down. Then an overall cover (not shown) is slid over the base 11 to isolate the interior from the environment. It will be appreciated that the wiring of this terminal block is particularly simple and yet is very effective.

In the alternative form of terminal block shown in Fig. 8 the lightning protectors are omitted and a simpler form of connector is employed. The lightning protectors may be located elsewhere e.g. in a separate box at the bottom of a telegraph pole.

In Fig. 8 the pivotal terminal blocks 41A

are modified so that hinge lugs 42A are disposed so that they are at the centre of the body 11, adjacent the longitudinal centre line of body 11, rather than near the edge. The advantage of this is that it eases the insertion of the drop wire pairs 9A into the passages 45A which, in this construction, are on the opposite side of the block from the hinge lugs so that they are again at the outer side of the block. The insertion of the wire is then slightly downward rather than upward which makes insertion easier.

As shown in Fig. 8 the terminal blocks 41A are pivoted by means of captive bolts in a similar manner to that described in relation to the arrangement shown in Figs. 1 to 7.

CLAIMS

1. A terminal block comprising an insulating body, at least one bifurcated solderless connector mounted on said body, a pivotally mounted element carried by said body, said element having at least one passage therein for a wire, the element having a hole therein extending transverse to the passage or passages, a captive bolt passing through the hole and being engageable with the female thread mounted on the body, whereby when said bolt is screwed into the female thread, the element pivots in a direction such that said wire is urged into the bifurcated solderless connector so that the conductor therein may make electrical contact with the connector, and, when the bolt is unscrewed, the pivotal element is made to pivot back to disengage the wire from the connector.

2. A terminal block according to claim 1, wherein the pivotal element is made of insulating material and has extending from one side edge at least one hinge lug for pivotal engagement with the body.

3. A terminal block according to claim 2 and in which the, or each, hinge lug engages a correspondingly shaped recess adjacent the longitudinal centre line of the terminal block.

4. A terminal block according to claim 2 and in which the or each hinge lug engages a correspondingly shaped recess adjacent a longitudinal edge of the terminal block.

5. A terminal block according to any of claims 1 to 4 in which the pivotal element has a recess to receive the bifurcated solderless connector and an arcuate ramp forming the side of the recess nearer the centre of pivoting of the pivotal element and having its centre of curvature approximately at the centre of pivoting, so that the ramp moves closely adjacent the bifurcated solderless connector during pivoting movement of the element.

6. A terminal block according to any of claims 1 to 5 and in which said connector is one of a pair of connectors and said pivotal element has two passages therein for two wires adapted to be urged into respective connectors.

7. A terminal block according to claim 6 and in which said pair of connectors form parts of one of a plurality of spaced pairs of one-piece metal terminals, each metal terminal including first, second and third connection points, the said connectors being the first connection points and being positioned to connect and retain the conductors of said wires which form a first wire pair.

8. A terminal block according to claim 7 and in which the second connection points are positioned to connect and retain the conductors of a second wire pair and the third connection points are positioned adjacent one another and adjacent an earthing connection point, whereby a lightning protector may be connected to both of the third connection points and to the earthing connection point.

9. A terminal block according to claim 7, wherein the first and second connection points are located on opposite faces of the insulating body.

10. A terminal block according to claim 7 or claim 8, wherein the first and third connection points are located on the same face of the insulating body.

11. A terminal block according to any of claims 7 to 10 wherein the earthing connection point is mounted in an insulating housing which can be inserted in or can be formed as part of the insulating body to cover the two third connection points of a pair, the insulating housing having on its surface, overlying the third connection points, apertures through which the plug terminals of the associated lightning protector may pass, to make electrical connections with the two third terminal points and the earth connection point.

12. A terminal block according to claim 11, wherein covers are hinged on the insulating housings to be movable from an open position in which the lightning protectors can be removed or inserted to a closed position in which the lightning protector is sealed from the environment.

13. A terminal block substantially as hereinbefore described with reference to and as illustrated in Figs. 1 to 7 of the accompanying drawings.

14. A terminal block substantially as hereinbefore particularly described and as illustrated in Fig. 8 of the accompanying drawings.